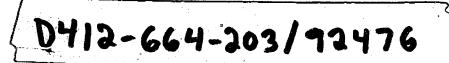
October-30-12	3:13:46 PM	:		E 1 2.								
Revision ID:	D412-664-203 Crosstube Aft		A	Accept	/ *N 900	040	100)*	Setup	Start Stop	*N *N	S1* S2*
Start Date: Required Date: Reference:	_	ty: 1.00 ety: 1.00	*1* *1*		Cust Item I	D:						
Approvals:	Process Plan: ML.	<u> </u>	Date: 12-10-30	Tooling:	D:	ate:			Run	Start,	*N	R1*
	QC:			SPC (Y/N):	Da	ate:				Stop	*N	R2*
Sequence ID/ Work Center ID	Operatio Descript			Set Up/ <u>(/</u> 4 / Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	t Rej Qty		Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr				 							<u></u>
D412-664-243	E/DEO	<u> </u>	2 SP	/SAS	<u> </u>							
100	DOCUME	NT CONTRO	L	0.00	, 1]	do	do	MIT	12-11-8
100 DC		Memo		(1 Cl 00.0	29				-7 <i>7</i>	AA	נטוון	1211-0
Document Control	.*		luefile and create labels as pe	r PPP D412-664-203 CI	— /							
110	Declaraine			0.00	×					1		
110 Packaging Packaging	Packaging	Memo	A F	0.00			M	10	12	-/ 10	131)+o->
*120	BENDING	MACHINE - (¥ CROSSTUBES	0.00		۸۸۸			-/	l=	·	
CNC Bend 2		Memo		0.00		MO			12/	0/3	<u> </u>	
CNC Alpha 160 Bend	er	Bend tube as Folio FT010	per Dwg D412-664-243 usin	g CNC bender program	412-aft and					1		



NCR:	Yes	/	No
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WORK ORDER NON-CONFORMANCE / UPDATE

4 1		
DQA:	1 7	•
DOA:	_Date: /2/14/2	
DUA.CHWI	Date. [4142	
		γ,

'	\checkmark								QA Closed:	UZ Date:	
Work Orde	er: 4	2476	, 2		DISPOSITION	1) [
Part N	10. <u>DA</u>	12-66	4-2	203	Rework Scrap Use-as-is \	Ther	Skid-tube Crosstube Machining Small Fab Thermoforming Finishing			Water Jet d. Eng. Coor. re/Packaging	Engineering Quality Other
NCR Î	10. [2	<u>- Z</u> (() <u>(</u>)		Work Order Update		Large Fab	Composite		Supplier	
Root				Descri	ption of work order update	Initial	Ad	ction	Sign &		
Cause	Date	Step	Qty	(or Non-conformance	Chief En	g Des	cription	Date	Verification	QC Inspector
Doc/Data Equip/Tooling Operator Material Setup Other Process Supplier Training	1241	100	1	CRUS	HING OVER TOL.	12/14/01	Acceptable attached	e per S.R.	12/11/0	12/11/07	16. 10 m
Unapproved			l	L	F	AULT CAT	_			1	
Landir	ng Gear			· · · · · · · · · · · · · · · · · · ·	General						
	Bending Centre	B Not Conce	ntric to (o/s .	Bend BOM/Route	Grain Hardw			Ovalized Over/Under	├	Pressure/Forced Temperature/Cure
	Cracks			<u> </u>	Broken/Damaged		tion Incomplete		Part Incorred	 	Weld
		d/Crimped			Burrs		ctions Incomplete, enance	/Unclear	Part Lost/Mi Part Moved	ssing	Wrong Stock Pulled
	Cuffs	4			Contamination Countersink	Mislab		<u> </u>	Positioned V	Vrong	
ļ	Heat Tr	eat on Strip in	Tuho	\vdash	Countersink Cut Too Short	Misrea		 	Power Loss/		Other
	Ripples	•	iube	-	Drill Holes	Offset		L_	J. Ower coss/	Juige	Total
		Waves in E	ytrusio	<u>,</u>	Drawing	\vdash	Calibration				
	—	Sequence		·	Finish		Sequence				
ŀ	—	wist in Tul			Folio	\vdash	le Dimensions				

October-30-12 3:15:46 PM

Item ID: Revision ID:	D412-664-2	203		Accept	*N90	0040	100)*	Setup St	tart *	151	k
Item Name:	Crosstube Af	ì							S	top *N	152	k ·
Start Date:	30/10/2012	Start Qty: 1.00	*1*		Cust Iten	ı ID:				•	u. ,,	
Required Date:	: 13/11/2012	Req'd Qty: 1.00	*1*		Custome							
Reference:			•									
Approvals:	Process Pla	an:	Date:	Tooling:		Date:				art *N	JR1	k
	QC:		_ Date:	SPC (Y/N):		Date:			Sı	top *N	1K2,	k
Sequence ID/ Work Center II	D (Operation Description		Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Numbe	Insp. r Stamp)
130	•	QC15- Crosstube Dimer	nsional Check	240								
130 QC Quality Control		· . Memo		0.00	2/11/01							
140		Crosstubes		0.00								
140 Crosstubes		Memo		0.00	•							_
Crosstubes		1-Drill pilot DT8551 and 2-Ream hol DT8550 & 1	drill table DT8577 using to finish size in tube a	vg D412-664-243 using drill on the second of	nstall towers.			Mo		12/1	1/01	
		3-SCRIBE F	PART # & BATCH #		٤							
				HEN HANDLING CROSST air damage within limits as pe		>	WC) <i>I</i>	2/11	<i>l</i> 05		

									DQA:	Date:	, \.
NCR:	Yes / No				WORK ORDER NON-	CONFO	RMANCE / UPI	DATE	QA Closed:	Date:	•
Work Orde	ar:				DISPOSITION			AGAINST DE			•
Part N	No.				Scrap Machining Small Fab Use-as-is Thermoforming Finishing Work Order Update Large Fab Composite			Crosstube Small Fab Finishing Composite	Pro Rec/Sto	Engineering Quality Other	
Root				Descr	ription of work order update	Initial	Act	ion	Sign &		
Cause	Date	Step	Qty		or Non-conformance	Chief Er	g Descr	ription	Date	Verification	QC Inspector
Doc/Data Equip/Tooling Operator Material Setup Other Process Supplier Training											·
		· · · · · · · · · · · · · · · · · · ·		 		AULT CA	EGORY				i
Landii	ng Gear Bending		·		General Bend	Grain	• •		Ovalized		Pressure/Forced
	Centre N Cracks	lot Conce		o/s	BOM/Route Broken/Damaged Burrs Contamination	Hardy Inspe Instru Mair	ware ction Incomplete ictions Incomplete/U tenance	Jnclear	Over/Under Part Incorre Part Lost/M Part Moved	ct	Temperature/Cure. * Weld Wrong Stock Pulled
	Heat Tre				Countersink		beled		Positioned V		104
		on Strip in	Tube		Cut Too Shor't Drill Holes	Misre Offse		L	Power Loss/	Surge	Other
	Ripples i Torque \	n Bend Naves in E	Extrusio	n -	Drawing	-	t f Calibration	•			

Out of Sequence

Outside Dimensions

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Turning Sequence

Wave/Twist in Tube

Finish

Outsource2

Outsource process - NDT

October-30-12 3:15:46 PM Item ID: D412-664-203 Accept *N900040100* Setup Start Revision ID: Crosstube Aft Item Name: **Start Date:** 30/10/2012 Start Qty: 1.00 Cust Item ID: **Required Date:** 13/11/2012 Req'd Qty: 1.00 **Customer:** Reference: Run Process Plan: Date: Approvals: Tooling: Date: Stop ____ Date: SPC (Y/N): Date: Operation Sequence ID/ Set Up/ Reject Tool ID Tool # Plan Accept Reject Insp. Work Center ID Description **Run Hours** Code Qty **Qty** Number Stamp 160 QC5- Inspect part completeness to step on W/O 0.00 *160* QC 0.00 Memo Quality Control *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** 170 0.00 *170* HandFXtube 0.00 Memo Hand Finishing Crosstubes *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** 1- CLEAN CROSSTUBE WITH WASH'N WIPE 180 Outsource process - NDT per QSI038 4.1 0.00 CX 12/11/08 *120*

0.00

*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***

Liquid Penetrant Inspection as per QSI 038Or Issue P/O: 1526 LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order

Memo

										DQA:	Date	:
NCR:	Yes / No				WORK ORDER NON-	COI	NFORM	MANCE / UP	DATE			•
										QA Closed:	Date	:
Work Orde	~ · ·				DISPOSITION				AGAINST DE	PARTMENT	/PROCESS	
WORK OF GR	er		······································		Rework	7		Skid-tube	Crosstube	1	Water Jet	Engineering
Part N	No.				Scrap	1		Machining	Small Fab	Pro	d. Eng. Coor.	Quality
·					Use-as-is	1		noforming	Finishing	4	re/Packaging	Other
NCR N	No				Work Order Update]		Large Fab	Composite		Supplier	
Root				Descri	ption of work order update		Initial	Ac	tion	Sign &		
Cause	Date	Step	Qty	Ċ	or Non-conformance	Cr	nief Eng	Desc	ription	Date	Verification	QC Inspector
Doc/Data												
Equip/Tooling												
Operator						Ì						
Material												
Setup												
Other		İ										
Process												
Supplier												
Training												
Unapproved												
					F	AUI	T CATE	GORY				
Landi	ng Gear				General		,			- 1		_
	Bending				Bend		Grain			Ovalized		Pressure/Forced
	Centre No	ot Concer	ntric to C	D/S	BOM/Route		Hardwa	re		Over/Under	tolerance	Temperature/Cure
	Cracks				Broken/Damaged	_	Inspecti	on Incomplete	-	Part Incorre	ct	Weld
	Crushed/	Crimped.			Burrs		Instruct	ions Incomplete/	Unclear	Part Lost/Mi	issing	Wrong Stock Pulled
	Cuffs				Contamination		Mainte	nance		Part Moved		
·	Heat Trea	at •			Countersink		Mislabe	led		Positioned V	Vrong	-
	Inspectio	n Strip in	Tube		Cut Too Short		Misread	l		Power Loss/	Surge	Other
	Rinnles in	Rend			Drill Holes		Offset					_

Out of Calibration

Out of Sequence

Outside Dimensions

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Turning Sequence

Wave/Twist in Tube

Torque Waves in Extrusion

Drawing

Finish

October-30-12	3:15:46 PM			9/4	'n							rage 4
Item ID: , Revision ID: Item Name:	D412-664-2 Crosstube Aft			Accept	*N900	040	1100) * s	Setup Si	tart top	*N *N	S1*
Start Date: Required Date: Reference:	30/10/2012 : 13/11/2012	Start Qty: 1.00 Req'd Qty: 1.00	*1* *1*		Cust Item I Customer:	D:					IVI	.T/
Approvals:	Process Pla	ın:	Date:	Tooling:	Da	ate:		R		tart	*N	R1*
	QC:		Date:	_ SPC (Y/N): _	Da	ate:	 		St	top	*N	R2*
Sequence ID/ Work Center II	D	Operation Description		Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty		eject umber	Insp. Stamp
100 Packaging		Packaging		0.00							12	lu/8 (v)
Packaging			LATEX GLOVES WHE	N HANDLING CROSSTUBE*	**						/	
			of NDT results attached	to work order.								
*200 *200*		QC5- Inspect part compl	eteness to step on W/O	0.00								DAS.
QC		Memo		0.00								02 115.11.
Quality Control		*** WEAR	LATEX GLOVES WHEN	N HANDLING CROSSTUBE*	**						•	
·		Inspect for d	amage & ensure results a	re as per Dwg D412-664-203								
203				0.00								
203 HandFXtube		Memo		0.00				1			\$	AB 12-11-8
Hand Finishing Cross	stubes	*** WEAR I	LATEX GLOVES WHEN	HANDLING CROSSTUBE**	*					ŧ		· · · · · · · · · · · · · · · · · · ·
		I - PRESSUR CROSSTUB	RE WASH AND THEN U	JSE WASH'N WIPE TO CLEA CONVERSION	N					•		

NCR:	Yes / N	0			WORK ORDER NON-	100	NFOR	MANCE / UPDATE					•	
										QA Closed:	Da	ite:	4	
Work Ord	er:				DISPOSITION Rework	_		AGAINST Skid-tube Crosstube		PARTMENT,	/PROCESS Water Jet		Engineering	
Part I	-				Scrap Use-as-is Work Order Update	Scrap Machining Small Fab Use-as-is Thermoforming Finishing					Prod. Eng. Coor. Rec/Store/Packaging Supplier			
Root				Descri	ption of work order update		Initial	Action		Sign &				
Cause	Date	Step	Qty	(or Non-conformance	Ch	nief Eng	Description		Date	Verificatio	n	QC Inspector	
Doc/Data Equip/Tooling Operator Material Setup Other Process Supplier Training Unapproved							T.CATE.	CONY						
• •						AUL	T CATE	GURY						
Landi	Bending Centre Not Concentric to O/S Cracks Crushed/Crimped Cuffs Heat Treat Inspection Strip in Tube Ripples in Bend Bend BOM/Route Broken/Damaged Burrs Contamination Countersink Cut Too Short Drill Holes				BOM/Route Broken/Damaged Burrs Contamination Countersink Cut Too Short		Instruct Mainte Mislabe Misread Offset	on Incomplete ions Incomplete/Unclear nance led		Ovalized Over/Under Part Incorred Part Lost/Mi Part Moved Positioned V Power Loss/	ct issing Vrong		Pressure/Forced Temperature/Cure Weld Wrong Stock Pulled Other	
	Turning Sequence Finish						Out of S	Sequence						

DQA:

Date:

Wave/Twist in Tube

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Work	Order	ID	92476
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92476

Page 5

October-30-12	3:15:46 PM			974	<i>(</i> ()						ruges
Item ID: ,Revision ID: Item Name:	D412-664-20 Crosstube Aft		· · · · · · · · · · · · · · · · · · ·	Accept	*N900	0040	100) * :	Setup Sta Sto	I	IS1* IS2*
Start Date: Required Date: Reference:	30/10/2012 : 13/11/2012	Start Qty: 1.00 Req'd Qty: 1.00	*1* *1*		Cust Item :					IN.	
Approvals:	Process Pla	n:	Date:	Tooling:	D	ate:		F	Run Sta	"1/	R1*
	QC:		Date:	SPC (Y/N):	D	ate:			Sto	*N	R2*
Sequence ID/ Work Center II	D	Operation Description		Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
205		QC7-Inspect Chemical C	Conversion Coat	0.00					-		•
205 QC Quality Control	·	Memo *** WFAR	LATEX GLOVES WHEN	0.00 HANDLING CROSSTUBE*	**						DAS) 1211

NCR:	Yes / No				WORK ORDER NON-	COI	NFORM	MANCE / UPD	ATE			• .
								,		QA Closed:	Date	
Work Ord	0.51				DISPOSITION				AGAINST DE	PARTMENT	/PROCESS	
Work Ord Part I					Rework Scrap Use-as-is		ſ	Skid-tube Machining noforming	Crosstube Small Fab Finishing	4	Water Jet d. Eng. Coor. re/Packaging	Engineering Quality Other
NCR I	No				Work Order Update]		Large Fab	Composite]	Supplier	
Root				Descri	otion of work order update	1	Initial	Actio		Sign &		
Cause	Date	Step	Qty	(or Non-conformance	Cr	nief Eng	Descri	ption	Date	Verification	QC Inspector
Doc/Data			'					! 				
Equip/Tooling												
Operator												
Material								}				
Setup												1
Other												
Process												
Supplier			1									
Training												
Unapproved										<u></u>	<u> </u>	<u> </u>
					· · · · · · · · · · · · · · · · · · ·	AUI	T CATE	3ORY				
Landi	ng Gear				General		1			٦		٦, ,,
	Bending			, <u> </u>	Bend	\vdash	Grain		-	Ovalized	<u> </u>	Pressure/Forced
	—	lot Conce	ntric to O/	'S -	BOM/Route	\vdash	Hardwa		-	Over/Under)	Temperature/Cure
	Cracks	<i>10 :</i> 1			Broken/Damaged	-	-	on Incomplete	 	Part Incorred	<u> </u>	Weld
		/Crimped		-	Burrs	\vdash	4	ions Incomplete/Ur	nciear	Part Lost/Mi Part Moved	Essing	Wrong Stock Pulled
	Cuffs	. 4		_	Contamination	-	Mainte		<u> </u>	╡	Mrana	
	Heat Tre		Tube	<u> </u>	Countersink	-	Mislabe		-	Positioned V Power Loss/		Other
	·····	on Strip in	Tube	<u> </u>	Cut Too Short	\vdash	Misreac Offset	1	<u></u>	Jeomei ross/	Juige	Touter
	Ripples i				Drill Holes	\vdash	4	Calibration				
		Waves in E		<u> </u>	Drawing	-	4					
	Lurning :	Sequence		1	Finish	L	Tont of 2	Sequence				

Date:

DQA:

Wave/Twist in Tube

October-30-12 3:15:46 PM Item ID: D412-664-203 Accept *N900040100* Setup Start -Revision ID: Item Name: Crosstube Aft **Start Date:** 30/10/2012 Start Qty: 1.00 **Cust Item ID: Required Date:** 13/11/2012 Req'd Qty: 1.00 **Customer:** Reference: Run **Approvals: Process Plan:** Date: Tooling: Date: Stop QC: SPC (Y/N): Date: Date: Sequence ID/ Operation Set Up/ **Tool ID** Tool# Plan Accept Reject Reject Insp. **Work Center ID** Description **Run Hours** Code Qty Qty Number Stamp 210 0.00 SprayPaint *210* SprayPaint 0.00 **Spray Painting** *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** ***Mask underside of crosstube as shown***

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per DEO D412-664-243 and OSI

005 4.2 clear 121625 PRIME: 122888 Start Time: 6:30 Fininsh Time: 7:20 PAINT: 123591 Start Time: 1:30 Finish Time: 2:30

³⁻ Apply clear coat after paint as per DEO

											DQA.		·
NCR:	Yes	/ No				WORK ORDER NON-C	OI	NFORM	MANCE / UPDATE		QA Closed:	Date	:
Work Ord	er.		·		*	DISPOSITION			AGAINS	T DE	PARTMENT/		
Part I	No.					Rework Scrap Use-as-is Work Order Update		ſ	Skid-tube Crosstube Machining Small Fal noforming Finishin Large Fab Composite	g	4	Water Jet d. Eng. Coor. e/Packaging Supplier	Engineering Quality Other
Root					Descrij	ption of work order update		Initial	Action		Sign &		
Cause		Date	Step	Qty	C	or Non-conformance	Ch	nief Eng	Description		Date	Verification	QC Inspector
Doc/Data Equip/Tooling Operator Material Setup Other Process Supplier Training Unapproved													
			·			F	AUL	T CATE	GORY				
Landi	ng G	iear				General					_		
		Bending Centre No Cracks Crushed/0		ntric to (o/s	Bend BOM/Route Broken/Damaged Burrs		Instruct	on Incomplete ions Incomplete/Unclear		Ovalized Over/Under Part Incorrec Part Lost/Mi	t _	Pressure/Forced Temperature/Cure Weld Wrong Stock Pulled
	\vdash	Cuffs				Contamination	_	Mainte		-	Part Moved	luona	
	\vdash	Heat Trea Inspectior		Tube		Countersink Cut Too Short	\vdash	Mislabe Misread		-	Positioned W Power Loss/S	_	Other
	\vdash	Ripples in				Drill Holes	Г	Offset			<u>,</u>	- L	

Out of Calibration

Out of Sequence

Outside Dimensions

Turning Sequence

Wave/Twist in Tube

Torque Waves in Extrusion

Drawing

Finish

92476

October-30-12	3:15:46 PM			972	+ / (1)						1 age
Item ID: Revision ID:	D412-664-2		·	Accept	*N900) () ()	110	n *	Setup Sta	1.71	S1*
Item Name: Start Date: Required Date Reference:	Crosstube Aft 30/10/2012: 13/11/2012	Start Qty: 1.00 Req'd Qty: 1.00	*1* *1*		Cust Item Customer:				Sto	^р *N	IS2*
Approvals:	Process Pla	an:	Date:)ate:		F	Run Sta Sto	1/1	R1* R2*
Sequence ID/ Work Center II 220 *270* QC Quality Control	D	Operation Description QC14- Inspect Spray Pa Memo Then, Wrap	int in plastic bag to protec	Set Up/ Run Hours 0.00 0.00 from scratches	Tool ID	Tool#	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
230 *230* Crosstubes Crosstubes		1- Install cha	per Dwg D412-664-20 afing shield as per DEC	0.00 0.00 0.00 0.01 0.01 0.00 0.00 0.00	ould be facing			\	<u>.</u> <u></u>		0AS 05 05
		2- Lightly so with 41058 v 3-Install supp	wash 'n' wipe port with Scotch-Weld		per DEO Dwg						

A/R Scotch-Weld DP460 Batch: 1229 00

EXP: 1.9.13

NCR:	Yes / No)			WORK ORDER NON-	COI	NFORI	MANCE / UPI	DATE			•		
										QA Closed:	Date	: ,		
Work Ord	or:				DISPOSITION		AGAINST DEPARTMENT/PROCESS							
Part 1					Rework Scrap	Skid-tube Crosstube Machining Small Fab			Pro	Water Jet d. Eng. Coor.	Engineering Quality			
NCR I	No				Use-as-is Work Order Update		Thern	noforming Large Fab	Finishing Composite	Rec/Sto	re/Packaging Supplier	Other		
Root				Descri	ption of work order update		Initial	Act		Sign &				
Cause	Date	Step	Qty		or Non-conformance	Ch	nief Eng	Descr	iption	Date	Verification	QC Inspector		
Doc/Data						ļ								
Equip/Tooling														
Operator											:			
Material														
Setup							•							
Other						-	. "							
Process							3			ļ	1			
Supplier														
Training														
Unapproved			اـــــا		r	<u> </u>	T CATE	CORY		1				
l andi	ng Gear				General	AUI	I CATE	JONT						
Lanoi	Bendin	-			Bend		Grain			Ovalized	ſ	Pressure/Forced		
	—	ธ Not Conce	ntric to C	\s -	BOM/Route	\vdash	Hardwa	ure.	 	Over/Under	tolerance	Temperature/Cure		
	Cracks	140t Conce	mine to c	" [*] -	Broken/Damaged	\vdash	4	ion Incomplete		Part Incorre	 	Weld		
	—	d/Crimped			Burrs	\vdash	1	ions Incomplete/L	Jnclear	Part Lost/M	 	Wrong Stock Pulled		
	Cuffs	a, 0pca	-		Contamination	\vdash	Mainte	•		Part Moved				
	Heat Tr	eat			Countersink		Mislabe			Positioned \	V rong			
		ion Strip in	Tube		Cut Too Short		Misread	t		Power Loss,		Other		
		in Bend			Drill Holes		Offset							
	_	Waves in I	Extrusion	,	Drawing		Out of (Calibration						
		Sequence			Finish		Out of 9	Sequence						

DQA:

Date:

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Wave/Twist in Tube

Quality Control

Memo

October-30-12 3:15:46 PM Item ID: D412-664-203 Accept Setup Start Revision ID: Item Name: Crosstube Aft **Start Date:** 30/10/2012 Start Qty: 1.00 **Cust Item ID: Required Date:** 13/11/2012 **Req'd Qty:** 1.00 **Customer:** Reference: Run Process Plan: Approvals: Date: Tooling: Date: Stop QC: Date: **SPC (Y/N):** Date: Sequence ID/ Operation Set Up/ Tool ID Tool # Plan Accept Reject Reject Insp. Work Center ID Description **Run Hours** Code Qty Qty Number Stamp 240 QC5- Inspect part completeness to step on W/O *240* Memo Quality Control 250 Pick Kit 0.00 *250* Packaging 0.00 Memo Packaging 260 QC4-100% Inspect kits for completeness 0.00

NCR:	Yes /	No				WORK ORDER NON-	100	VFOR	MANCE / UPDA		0.4.61	Data	
	÷					T					QA Closed:	Date	
Work Ord	er:					DISPOSITION				AGAINST DE	PARTMENT	PROCESS	,
	_					Rework]		Skid-tube	Crosstube		Water Jet	Engineering
Part	No					Scrap]		Machining	Small Fab		d. Eng. Coor.	Quality
NCD	N.I					Use-as-is		Therr	noforming	Finishing Composite	Rec/Stor	e/Packaging Supplier	Other
NCR I	NO	·			 	Work Order Update]		Large Fab	composite		3upplier	
Root					Descri	ption of work order update		nitial	Actio	n	Sign &		
Cause		Date	Step	Qty	(or Non-conformance	Ch	ief Eng	Descrip	tion	Date	Verification	QC Inspector
Doc/Data	Ш												
Equip/Tooling	Ш										i		
Operator	Ш												
Material	Ш			}									
Setup ·	Ш							30					
Other	Ш												
Process	Ш												
Supplier	Ш												
Training	Ш									·			
Unapproved		,											
		<u>.</u>					AUL	T CATE	GORY				
Landi	ng Gea				_	General		1			1	_	-
	-	nding				Bend	\vdash	Grain		 	Ovalized		Pressure/Forced
	⊢		t Concer	ntric to (D/S	BOM/Route		Hardwa			Over/Under	_	Temperature/Cure
	-	acks			-	Broken/Damaged	<u> </u>	1	ion Incomplete		Part Incorred	-	Weld
			Crimped.		<u> </u>	Burrs	_	-	ions Incomplete/Und	 	Part Lost/Mi	ssing	Wrong Stock Pulled
	—	ffs				Contamination		Mainte			Part Moved		
	${f m m m m m m m m m m m m m $	at Trea			_	Countersink		Mislabe		<u> </u>	Positioned V		 1
	\vdash		Strip in	Tube	<u> </u>	Cut Too Short		Misread	d		Power Loss/	Surge	Other
		oples in				Drill Holes		Offset					
	∐To	rque W	aves in E	xtrusion		Drawing		4	Calibration				
	Tu	rning Se	equence			Finish		Out of	Sequence				

DQA:

Date:

Wave/Twist in Tube

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

October-30-12 3:15:46 PM Item ID: D412-664-203 Accept *N900040100* Setup Start Revision ID: Crosstube Aft Item Name: **Start Date:** 30/10/2012 Start Qty: 1.00 **Cust Item ID: Required Date:** 13/11/2012 **Req'd Qty:** 1.00 **Customer:** Reference: Run Start Process Plan: ___ **Approvals:** Date: Tooling: Date: Stop QC: Date: SPC (Y/N): Date: Operation Sequence ID/ Set Up/ Tool ID Tool # Plan Reject Reject Accept Insp. **Work Center ID** Description Qty Qty **Run Hours** Code Number Stamp 270 0.00 Packaging *270* Packaging 0.00 Memo Packaging Identify and pack for shipping as per PPP D412-664-203 ******Ensure tube is not packaged if curing time is less than 12 hrs, see step 27 for application time & date ****** Time & date of packaging: Location 103

280

QC21- Final Inspection - Work Order Release

0.00

280

Quality Control

Memo

0.00

12/12/3d

12-11-20

NCR:	Yes / No				WORK ORDER NON-	100	NFORI	MANCE / UPI	DATE				•
	•									QA Closed:	Date	ā: "	
Work Ord	er.				DISPOSITION				AGAINST DE	PARTMENT	/PROCESS		
WORK OF G	C1.				Rework	٦		Skid-tube	Crosstube]	Water Jet	Engineeri	ng
Part f	No.				Scrap	1		Machining	Small Fab	Pro	d. Eng. Coor.	Quali	
	<u> </u>				Use-as-is		Therr	moforming	Finishing	Rec/Sto	re/Packaging	Oth	er
NCR I	No				Work Order Update			Large Fab	Composite		Supplier		
Root				Descri	tion of work order update		nitial	Act	tion	Sign &		7	
Cause	Date	Step	Qty	(or Non-conformance	Ch	ief Eng	Desci	ription	Date	Verification	QC Insp	ector
Doc/Data													r
Equip/Tooling													
Operator													
Material													
Setup ¯													
Other													
Process													
Supplier													
Training													
Unapproved		<u> </u>	<u> </u>							<u></u>	l		
					**************************************	AUL	T CATE	GORY					
Landi	ng Gear			_	General		l .		f	1 .	г		
	Bending				Bend	_	Grain		ļ	Ovalized		Pressure/For	
	Centre No	ot Concer	ntric to (D/S	BOM/Route	-	Hardwa			Over/Under	-	Temperature	e/Cure
	Cracks				Broken/Damaged			ion Incomplete		Part Incorre	<u>}-</u>	Weld	/
	Crushed/0	Crimped.		ļ	Burrs	<u> </u>		tions Incomplete/l	Unclear	Part Lost/Mi	ssing	Wrong Stock	(Pulled
	Cuffs				Contamination	_		enance	<u> </u>	Part Moved			,
	Heat Trea			<u> </u>	Countersink	<u> </u>	Mislabe		<u> </u>	Positioned V			
	Inspection		Tube		Cut Too Short	-	Misread	d		Power Loss/	Surge [Other	
	Ripples in			_	Drill Holes	-	Offset						
	Torque W			' <u> </u>	Drawing	_		Calibration -					
	Turning So	equence			Finish		Out of !	Sequence					

Date:

DQA:

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Wave/Twist in Tube

Picklist Print

· October-30-12 3:15:49 PM

Work Order ID: 92476

_ ...

D412-664-203

' Parent Item Name: Crosstube Aft

92476

D412-664-203

Start Date: 30/10/2012

Required Date: 13/11/2012

Start Qty: 1.00

Required Oty: 1.00

Comments:

Parent Item:

IPP Rev:E04.02.16Reformat; Added D3189-1K/DS

 IPP Rev:F
 06-03-29
 Remove Coments on Pick List
 JLM

 IPP Rev:G
 06.12.08
 per ECN 886
 EC

 IPP Rev:H
 07-04-30
 As per Rev D
 JLM

IPP Rev:I 08-06-12 add comment in seq. 21 DD verified by:EC IPP rev J

11.04.21 DEO D412-664-243-E-1 EC verified DD IPP REV:K

11.10.03 DEO D412-664-243-E-2 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D412-664-203TRN		Manufactured	No			110	Each	4.0000	1	1			
D412-664 Crosstube Turning Detail	203TF	N							**				
				<u>Locatio</u> LG	B91778 83835	<u>Loc (</u>	<u>)ty</u> 4 1	Loc Code	_		_ Mo	12/1	0/31
					87158 90960 90961		1 1 1				 		
*D2896-1 *D2896-1*		Manufactured	No			230	Each	33.0000	1 **	1		, 12 1 25	
				<u>Locatio</u>	<u>n</u>	Loc C	<u>ity</u>	Loc Code					
				LG053	74465 86663 88695		33 8 12 13				- - -		
D3189-1 *D3189-1* Chafing Shield(send DS19629	with spares)	Manufactured	No	-	00073	230	Each	16.0000	2 **	2	M 12	:11.25	
2017029	<i>Spa.</i> v <i>S y</i>			Location	1	Loc Q	<u>ty</u> 16	Loc Code					

16

89901

NCR:	Yes	/ No				WORK ORDER NON-	COI	NFORM	MANCE / UPC	DATE			•
											QA Closed:	Date:	ì
Work Ord	ler:					DISPOSITION				AGAINST D	PARTMENT	/PROCESS	,
Part No. NCR No.						Rework Skid-tube Crosstube Scrap Machining Small Fab Use-as-is Thermoforming Finishing Work Order Update Large Fab Composite			Small Fab Finishing	4	Water Jet d. Eng. Coor. re/Packaging Supplier	Engineering Quality Other	
Root					Descri	ption of work order update		Initial	Acti	ion	Sign &		
Cause		Date	Step	Qty		or Non-conformance	Ch	nief Eng	Descr	iption	Date	Verification	QC Inspector
Doc/Data Equip/Tooling Operator Material Setup Other Process Supplier Training Unapproved													
	11		1		<u> </u>	F	AUL	T CATE	GORY				
Landi	ing G	ear				General		_					
		Bending Centre No Cracks Crushed/O Cuffs Heat Trea nspection Ripples in Forque W	Crimped. t n Strip in Bend laves in E	Tube Extrusio		Bend BOM/Route Broken/Damaged Burrs Contamination Countersink Cut Too Short Drill Holes Drawing		Instructi Mainte Mislabe Misread Offset Out of C	on Incomplete ions Incomplete/U nance led I Calibration	Inclear	Ovalized Over/Under Part Incorre Part Lost/M Part Moved Positioned N	ct issing Wrong	Pressure/Forced Temperature/Cure Weld Wrong Stock Pulled Other
	1 13	Turning S	annanna		1	Finish	1	I Out of S	equence				

DQA:

Date:

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Wave/Twist in Tube

•October-30-12 3:15:49 PM

Work Order ID: 92476

D412-664-203

'Parent Item Name: Crosstube Aft

92476 *D412-664-203*

Start Date: 30/10/2012

Required Date: 13/11/2012

Start Qty: 1.00

Required Qty: 1.00

D3595-063-570

Parent Item:

Manufactured

230

Each

105.0000

RUBBER CUSHION

Location	Lo	e Qty	Loc Code		
FG		8			
37971		1			
42243		7			
LG		78			
83294		78			
MAT052		19			****
71534		1			
76546		18			
	230	Each	95.0000	4	4

MS21920-28

Purchased

No

**

Clamp(per MIL-DTL-8783C)

Location		Loc Qty	Loc Code	
FG		5		
	105884	5		*****
LG050		10		
	118713	3		
	120054	2		
•	122518	5		
LG051		80		
	121440	8		
	122204	10		
	122838	14		
	123243	48		

										DQA:	Date:	
NCR: Y	es / No				WORK ORDER NON-O	COI	NFORM	MANCE / UP		QA Closed:	Date:	•
Work Orde	ır.	•		· ·	DISPOSITION				AGAINST DE	PARTMENT	/PROCESS	
Part N	0.				Rework Scrap Use-as-is Work Order Update	Skid-tube Crosstube Machining Small Fab Thermoforming Finishing Large Fab Composite			4	Water Jet d. Eng. Coor. re/Packaging Supplier	Engineering Quality Other	
Root				Descri	ption of work order update		nitial	Ac	tion	Sign &		
Cause	Date	Step	Qty	(or Non-conformance	Ch	ief Eng	Desc	ription	Date	Verification	QC Inspector
Doc/Data									***			
quip/Tooling												
Operator Material					•							
Setup							·					
Other												
Process										1		
Supplier												
Training												
Unapproved												,
•		•	·		F	AUL	T CATE	GORY				
Landin	g Gear				General					_		_
	Bending				Bend		Grain			Ovalized		Pressure/Forced
	Centre No	ot Concer	ntric to (D/S	BOM/Route		Hardwa	re		Over/Under	tolerance	Temperature/Cure
	Cracks		,		Broken/Damaged		Inspecti	on Incomplete		Part Incorre	ct	Weld
	Crushed/	Crimped.			Burrs			ions Incomplete/	Unclear	Part Lost/Mi	ssing	Wrong Stock Pulled
1	Cuffs				Contamination	\vdash	Mainte			Part Moved		
	Heat Trea			<u> </u>	Countersink	\vdash	Mislabe			Positioned V		٦
	Inspection	•	Tube	<u> </u>	Cut Too Short	—	Misreac	l		Power Loss/	Surge	Other
	Ripples in	Bend			Drill Holes	-	Offset					
	Torque W	aves in E	xtrusion	1	Drawing		Out of C	Calibration				

Out of Sequence

Outside Dimensions

Turning Sequence

Wave/Twist in Tube

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

- October-30-12 3:15:49 PM

Work Order ID: 92476

Parent Item:

D412-664-203

'Parent Item Name: Crosstube Aft

Purchased

Purchased

Purchased

No

No

92476 *D412-664-203*

Start Date: 30/10/2012

Required Date: 13/11/2012

Start Qty: 1.00

**

Required Qty: 1.00

MS21920-30

MS21920-30

clamp(per MIL-DTL-8783C)

Location	<u>1</u>	<u>Lo</u>	c Qty
LG			7
	119529		7
LG050			50
	123240		50
LG051			44
	111258		14
	121583		30
-		250	Each

230

Each

Loc Code

101.0000

**

AN6-41A

Bolt

Location	<u>Lo</u>	c Qty
ST340		74
122416		24
123021		50
ST342		6
120833		4
121827		2
	250	Each

Loc Qty Location ST340 122407 34 ST342 121825

Loc Code

35.0000

Loc Code

NCR: Y	'es / No				WORK ORDER NON-	CON	NFOR	MANCE / UP	DATE		Data	•
·										QA Closed:	Date:	45
Work Orde	er:				DISPOSITION				AGAINST DE	PARTMENT	/PROCESS	•
					Rework	7 		Skid-tube	Crosstube]	Water Jet	Engineering
Part N	lo				Scrap]	1	Machining	Small Fab		d. Eng. Coor.	Quality
					Use-as-is	↓ 	Thern	noforming	Finishing	Rec/Sto	re/Packaging	Other
NCR N	lo				Work Order Update	ا		Large Fab	Composite	J	Supplier]
Root				Descri	ption of work order update	<u> </u>	nitial	Act	tion	Sign &		
Cause	Date	Step	Qty		or Non-conformance	Ch	ief Eng	Desci	ription	Date	Verification	QC Inspector
Doc/Data												
Equip/Tooling	_					ŀ						
Operator	_											
Material	_											
Setup	_											
Other												
Process												
Supplier					·							
Training	_											
Unapproved						<u> </u>	TCATE	CORY		<u> </u>		
Landin	ig Gear				General	AUL	T CATE	GURY				
	Bending			<u> </u>	Bend	П	Grain			Ovalized	Г	Pressure/Forced
ŀ	Centre No	nt Concer	ntric to C)/s	BOM/Route	\vdash	Hardwa	re		Over/Under	tolerance	Temperature/Cure
<u> </u>	Cracks	or concer	Title to c	""	Broken/Damaged	\vdash		ion Incomplete	<u> </u>	Part Incorre	 	Weld
.	Crushed/	Crimned		-	Burrs	_		ions Incomplete/	Unclear	Part Lost/Mi	⊢	Wrong Stock Pulled
	Cuffs	opes.			Contamination	-	Mainte	· ·		Part Moved		
	Heat Trea	ıt		<u> </u>	Countersink	\vdash	Mislabe			Positioned V	Vrong	
f	Inspection		Tube	-	Cut Too Short	\vdash	Misread			Power Loss/	· -	Other
ŀ	Ripples in				Drill Holes		Offset		<u> </u>			
	Torque W		xtrusion		Drawing		Out of 0	Calibration		-		
	Turning S			-	Finish		Out of S	Sequence				

DQA:

Date:

Wave/Twist in Tube

• October-30-12 3:15:49 PM

Work Order ID: 92476

Parent Item:

D412-664-203

'Parent Item Name: Crosstube Aft

92476 *D412-664-203*

Start Date: 30/10/2012

Required Date: 13/11/2012

Start Qty: 1.00

Required Qty: 1.00

NAS1149D0663J Purchased AN960JD616

MS21042L6

Purchased

No

No

250

250

Each

Each

Location	Loc Qty	Loc Code	
314	195		
122441	195		
ST300	239		
117677	25		
118384	3		
118927	48		
119075	4		
120308	159		$ \alpha$
ST314	500		
123248	350		
123355	150		

October-30-12 3:15:49 PM

											DQA:	Date:	-
NCR:	Yes /	/ No				WORK ORDER NON-	CON	FORM	ANCE / UP	DATE	,		•
											QA Closed:	Date:	
Work Ord	or:					DISPOSITION			•	AGAINST DE	PARTMENT,	/PROCESS	
Work Ord	E1. —		· · · · · · · · · · · · · · · · · · ·			Rework	7 I		Skid-tube	Crosstube		Water Jet	Engineering
Part I	No					Scrap	11	ſ	Machining	Small Fab		d. Eng. Coor.	Quality
NCR I	No					Use-as-is Work Order Update			Large Fab	Finishing Composite	Rec/Stoi	re/Packaging Supplier	Other
Root					Descri	ption of work order update	Ir	nitial	Ac	tion	Sign &		
Cause		Date	Step	Qty	C	or Non-conformance	Chi	ef Eng	Desc	ription	Date	Verification	QC Inspector
Doc/Data			• *										
Equip/Tooling													
Operator													
Material													
Setup-													
Other													
Process													
Supplier					•								
Training													
Unapproved						•							
						F	AULT	CATE	GORY				
Landi	ng Ge	ar				General							
	В	ending				Bend		Grain			Ovalized		Pressure/Forced
	\Box_{c}	ontro No	t Concer	tric to C	1/5	ROM/Route	П	Hardwa	rρ		Over/Under	tolerance	Temperature/Cure

Inspection Incomplete

Maintenance

Out of Calibration

Out of Sequence

Outside Dimensions

Mislabeled

Misread Offset

Instructions Incomplete/Unclear

Part Incorrect

Part Moved

Part Lost/Missing

Positioned Wrong

Power Loss/Surge

Weld

Other

Wrong Stock Pulled

Broken/Damaged

Contamination

Countersink

Cut Too Short

Drill Holes

Drawing

Finish

Folio

Burrs

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Ripples in Bend

Turning Sequence

Wave/Twist in Tube

Cracks

Cuffs

Heat Treat

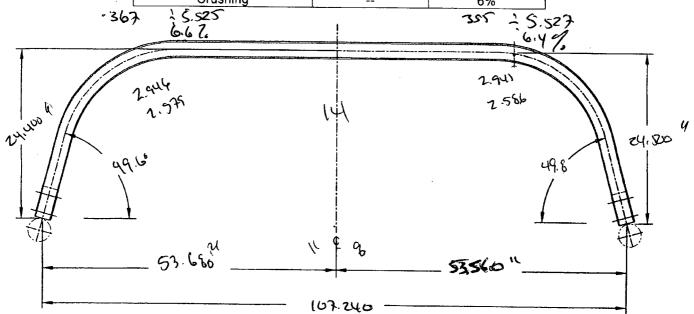
Crushed/Crimped.

Inspection Strip in Tube

Torque Waves in Extrusion

DART AEROSPACE LTD	Work Order:	92476
Description: Crosstube High Aft (412)	Part Number:	D412-664-203
Inspection Dwg: D412-664-243 Rev: E		Page 1 of 1

	Required Dimension	Min	Max
	Height	24.24	24.50
	1/2 Span	53.59	53.85
	Angle	49	52
	Total Span	107.18	107.70
	Bending Passes	8	
	Crushing		6%
-367	15,525		325
- /	6.67.	!	



	Side A	M	ρρα Side B
Bending Passes	i l	7	4 84
Crushing	6.6%		6.476
Some As Le	Comments		
Sire Az 6.6 %	crushi O 1		Proses'
misple 2 14	PASSES		
Sine B 2 6.47	costa Q	8	PASS-7.

QC15 Inspection	PAC				
Date	16	17	11	12	
***************************************	0 -0			-	

Rev	Date	Change	Revised by	Approved
Α	07.02.06	New Issue	KJ/JM	7.66100
В	07.05.08	Dimensions updated per Dwg rev. D	KJ/JLM	
С	10.02.02	Dwg Rev updated	KJ A	
D	12.04.16	Added bending, crushing dimensions	KJ 4	P

Item	Qty -243	Part Number	Description
1	х	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
2	1	D6009-129	CROSSTUBE
3	2	D3595-063-570	RUBBER CUSHION
4	1	D2896-1	SUPPORT
5	2	D3189-1	CHAFING SHIELD
6	2	D2856-600-1009	ABRASION STRIP
7	4	MS21920-28	CLAMP
8	2	MS21920-30	CLAMP (OR MS21920-32)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

1) MATERIAL: MANUFACTURED FROM D6009-129

FINISHED LENGTH = 124.100±0.020 (BEFORE BENDING/TRIMMING)

CHEMICAL CONVERSION COAT PER DART QSI 005 4.1 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2 PAINT OUTSIDE PER DART QSI 005 4.2

- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: SCRIBE DART PART NUMBER "D412-664-243" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- WEIGHT: 47.0 lbs (PER IIN-D212-664)
- PART IS SYMMETRIC ABOUT CENTÉRLINE.
- RUN CUTTER OFF PART, BLEND OUT EDGE LONGITUDINALY, TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE
- FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.

 13) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE THE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 15) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES. NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

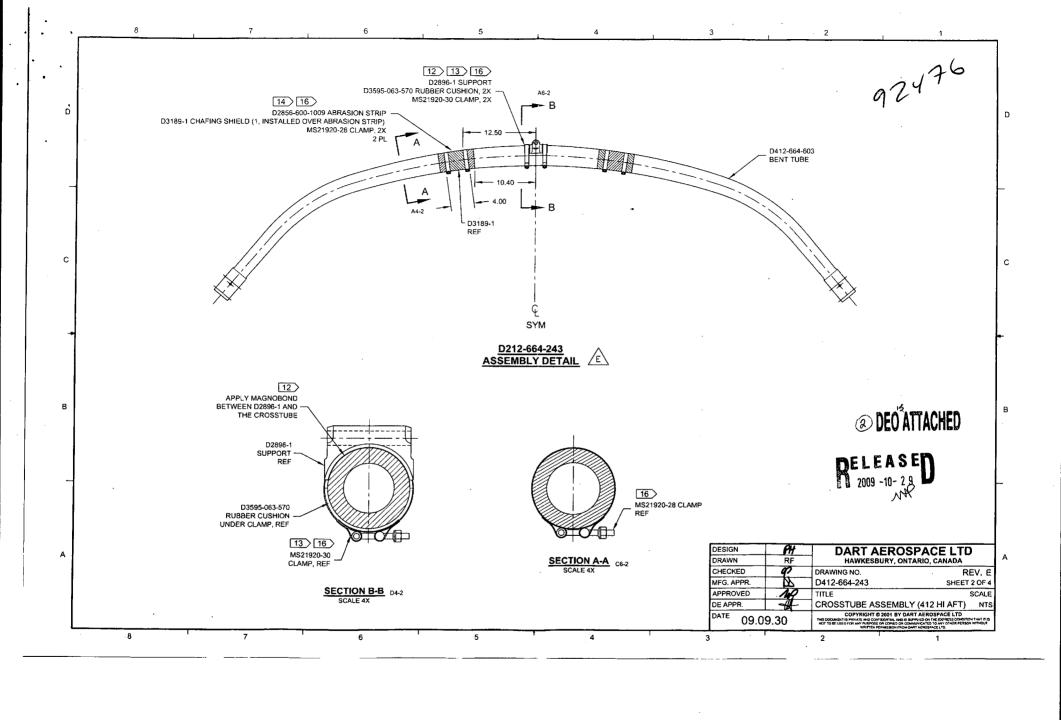
SHOP CORY RETURN TO ENGINEERING UNCONTROLLED COPY SUBJECT TO AMENDMENT WITHOUT NOTICE WORK ORDER NO 92476 MLJ

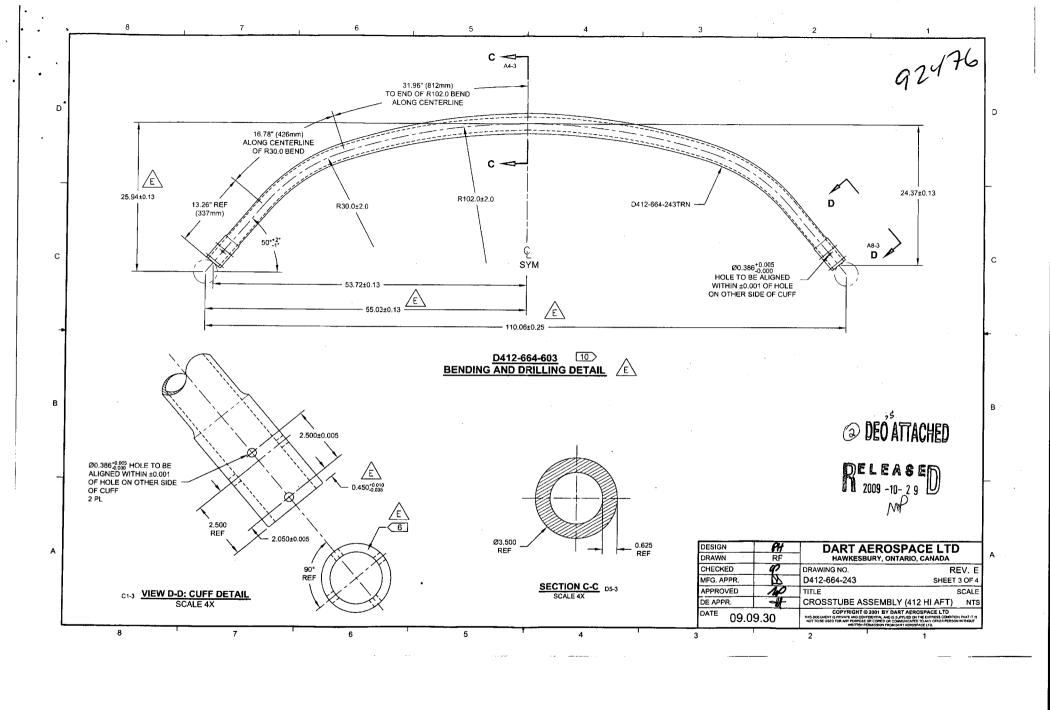
12-10-30

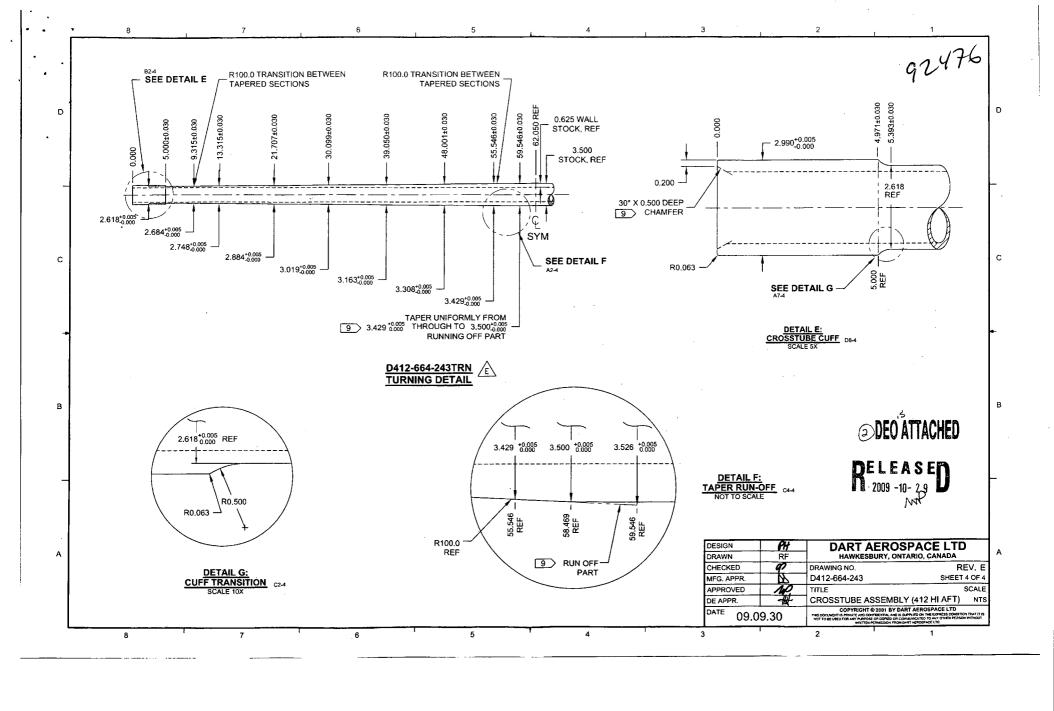
@ DEO ATTACHED

DECION	01 5455455005	- 00	TO
REV.	DESCRIPTION	BY	DATE
Α	NEW ISSUE	PH	01.10.17
В	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	РН	05.02.04
С	REMOVE D2856-600-1087, ADD D2732-058 & MAGNOBOND 6398, MS21920-32 WAS MS21920-30	МВ	06.10.27
D	REMOVE D2732-058, CHANGE TO D3595-063-570	PH	07.03.09
E	REFORMAT/REVISE GENERAL NOTES; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); ADD TOLERANCE (ZN B6-3, C4-3, C8-3 & C5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	, RF	09.09.30

DESIGN	PH	DART AEROSE	PACE LTD						
DRAWN	RF		HAWKESBURY, ONTARIO, CANADA						
CHECKED	P	DRAWING NO.	REV. E						
MFG. APPR.	17	D412-664-243	SHEET 1 OF 4						
APPROVED	140	TITLE	SCALE						
DE APPR.	-#	CROSSTUBE ASSEMBLY	(412 HLAFT) NTS						
DATE 09.0	9.30	COPYRIGHT @ 2001 BY DART THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLY	LIED ON THE EXPRESS CONDITION THAT IT IS						







DRAWING NO.	TITLE	REV. E	DART AEROSPACE LT	D	.E.O. NO.	SHEET NO.	SCALE
D412-664-243	CROSSTUBE ASSI	EMBLY (412 HI AFT)	ENGINEERING ORDER	[0412-664-243-E-1	SHEET 1 OF 2	NTS
DRAWN	K CHECKI	ED JAF	MFG. APPR.	APPR	ROVED MAP	DE APPR.	
DATE 11.03	3.31 DATE	11/03.31	DATE //.03.31	DATE	11/03.31	DATE 11-03.31	

PURPOSE:

REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890.

CHANGE:

PARTS LIST IS AMENDED AS FOLLOWS:

<u>IS:</u>

Item	Qty -243	Part Number	Description				
6	0	D2856-600-1009	ABRASION STRIP				

WAS:

6	2	D2856-600-1009	ABRASION STRIP

NOTES 2 AND 14, SHEET 1 ARE AMENDED AS FOLLOWS:

<u>IS:</u>

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2

MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA)

PAINT OUTSIDE PER DART QSI 005 4.2

AFTER PAINTING, APPLY CLEAR COAT ON HATCHED AREA

14) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3189-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.

WAS:

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2 PAINT OUTSIDE PER DART QSI 005 4.2
- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.



DRAWING NO. TITLE REV. E DART AEROSPACE LTD D.E.O. NO. SHEET NO. CROSSTUBE ASSEMBLY (412 HI AFT) D412-664-243 **ENGINEERING ORDER** D412-664-243-E-1 SHEET 2 OF 2 NTS DRAWN CHECKED MFG. APPR. DE APPR. **APPROVED** 11.03.31 11.00.31 DATE DATE DATE 11-03-31 DATE 11.03.3 DATE 11.03.31 IS: WAS: 14 16 D2856-600-1009 ABRASION STRIP D3189-1 CHAFING SHIELD (1, INSTALLED OVER PROSEAL 890) D3189-1 CHAFING SHIELD (1, INSTALLED OVER ABRASION STRIP) MS21920-28 CLAMP, 2X MS21920-28 CLAMP, 2X 2 PL D412-664-603 BENT TUBE D3189-1 REF D412-664-243 ASSEMBLY DETAIL $\sqrt{2}$ MASK AREA PRIOR TO PAINTING AND APPLY CLEAR COAT AFTER PAINTING 2.00 COPYRIGHT @ 2011 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DAYA FAROSPACE LTD.

DRAWING N	· .	REV. E	DART AEROSPACE LTI		SHEET NO.	SCALE
D412-664	-243 CROSS10	BE ASS'Y (412 HI AFT)	ENGINEERING ORDER	D412-664-243-E-2	SHEET 1 OF 1	NTS
DRAWN	P	CHECKED AS	MFG. APPR.	APPROVED M	DE APPR.	
DATE	11.09.07	DATE 11.09.19	DATE ((.01.19	DATE 11.09.19	DATE 11.09.19	

PURPOSE:

REPLACE MAGNOBOND WITH 3M DP460 SCOTCH-WELD EPOXY ADHESIVE

CHANGE:

IS:

item	Qty Part Number -243		Description				
9	A/R	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD				

WAS:

9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II. CLASS 2 ADHESIVE)

NOTE 12 & 16, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) INSTALL D2896-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015. LET CURE FOR 24 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVE HAS CURED FOR 24 HOURS.

WAS:

- 12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.



1										, –
	DRAWING NO.	TITLE		REV. E	DART AEF	ROSPACE LTD	D.E.O. NO		SHEET NO.	SCALE
	D412-664-243	CROSSTUB	E ASSEMBLY (4	1₽ HLAFT)	ENGINER	RING ORDER	D412-66	64-243-E ₅ 4	SHEET 1 OF 3	NTS
,	DRAWN G)	CHECKED C	Þ	MFG. APPR.	<u>M</u>	APPROVED	1A	DE APPR.	
	DATE 12.08	21	DATE 12	26.30	DATE /	2.08.30	DATE	12/4/30	DATE 12.08	- 30
						Cale Control of the C		<u></u>		

PURPOSE:

REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890. UPDATE INSTALLATION OF CHAFING SHIELDS AND REDUCE TORQUE TO 40-50 IN-LBS. THIS ENGINEERING ORDER SUPERCEDES DEO D412-664-243-F-1.

CHANGE:

PARTS LIST IS AMENDED AS FOLLOWS:

IS:

ltem	Qty -243	Part Number	Description
6	0	D2856-600-1009	ABRASION STRIP

WAS:

6	2	D2856-600-1009	ABRASION STRIP

NOTES 2, 14, AND 16 ON SHEET 1 ARE AMENDED AS FOLLOWS:

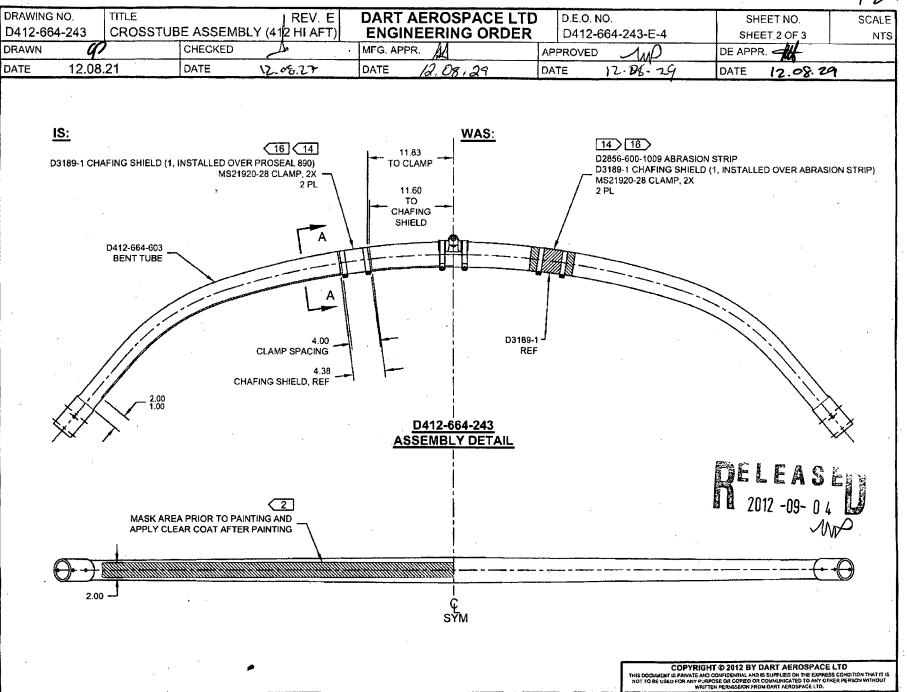
<u> 18:</u>

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
 MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA)
 PAINT OUTSIDE PER DART QSI 005 4.2
 AFTER PAINTING, APPLY CLEAR COAT ON HATCHED AREA
- 14) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3189-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.
- 16) TORQUE CLAMPS ON D2896-1 SUPPORT 80 TO 100 IN-LB. TORQUE CLAMPS ON D3189-1 CHAFING SHIELD 40 TO 50 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

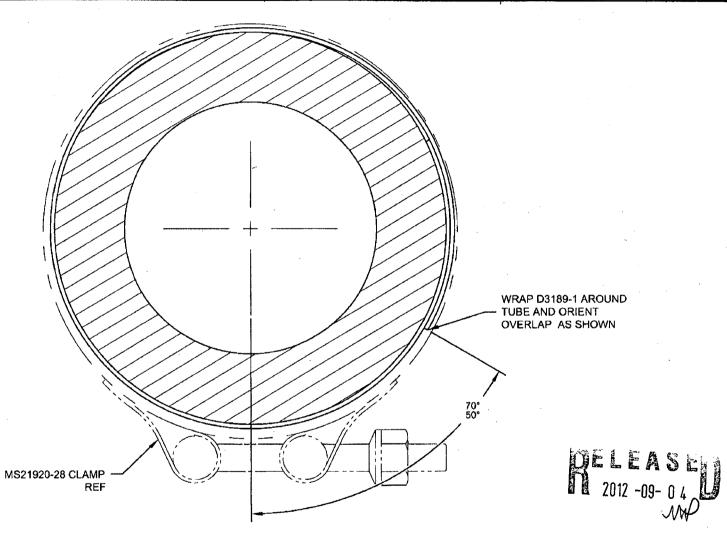
WAS:

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
 PAINT OUTSIDE PER DART QSI 005 4.2
- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.





DRAWING	NO.	TITLE		REV. E	DART AEROSPACE L	TD	D.E.O. NO.	SHEET NO.	SCALE
D412-66	4-243	CROSST	JBE ASSEMBL	Y (412 HI AFT)	ENGINEERING ORDE	ER	D412-664-243-E-4	SHEET 3 OF 3	NTS
DRAWN	q1)	CHECKED	فلس	MFG. APPR.	AP	PROVED W	DE APPR.	
DATE	12.08.	21	DATE	12.08.27	DATE 12,08,29	DA	TE 12.08.29	DATE 12 08.29	



SECTION A-A
CHAFING SHIELD DETAIL VIEW ROTATED, NOT TO SCALE

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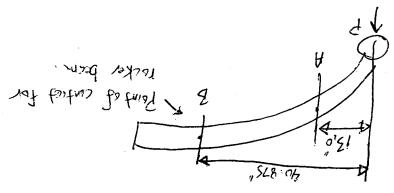
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DART AEROSPACE LTD.



5.0 PARTS LIST

5.1 HIGH GEAR CROSSTUBES

Item	-101	-201 {	-203	Part Number	Description
	х			D212-664-101	CROSSTUBE INSTALLATION, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH FWD
		х		D212-664-201	CROSSTUBE INSTALLATION, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH AFT
			х	D412-664-203	CROSSTUBE INSTALLATION, 412 HIGH AFT
1	1			D212-664-141	CROSSTUBE ASSEMBLY, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH FWD
2		1		D212-664-241	CROSSTUBE ASSEMBLY, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH AFT
3			1	D412-664-243	CROSSTUBE ASSEMBLY, 412 HIGH AFT
					CUPOCOT
10	2			* D2893-1	SUPPORT RUBBER CUSHION
11	4			* D3595-063-450	CLAMP (OR MS21042-26)
12	4	<u> </u>		* MS21920-25	BOLT
13	4			AN6-35A	BOLT
14	4			AN6-36A	NUT (OR MS21042-6)
15	6			MS21042L6	WASHER
16	18			AN960JD616	WASHER
20		2		* D2940-1	SUPPORT
21		4		* D3595-063-530	RUBBER CUSHION
22		4		* MS21920-28	CLAMP (OR MS21042-30)
23		4		AN6-40A	BOLT
24		2		AN6-41A	BOLT
25		6		MS21042L6	NUT (OR MS21042-6)
26		18		AN960JD616	WASHER
		<u> </u>			
30			1	* D2896-1	SUPPORT
32		<u> </u>	2	* D3595-063-570	RUBBER CUSHION
33			4	* MS21920-28	CLAMP
34		 	2	* MS21920-30	CLAMP (OR MS21042-32)
35		 		=AN6-40A	BOLT
36	· · · · · · · · · · · · · · · · · · ·		2==	-AN6:41A	:BOLT:
37				MS21042L6	-NUT-(OR MS21042-6)
38		 		=AN960JD616	-WASHER>
39			2	* D3189-1	CHAFING SHIELD
	1	1		D3428-1	PLACARD
50	1	1		D3428-1	PLACARD

^{*}REFERENCE ONLY. PARTS ARE INCLUDED IN D212-664-141/-241 OR D412-664-243 ASSEMBLIES ABOVE NOTE: KITS INCLUDE EXTRA HARDWARE FOR COMPATIBILITY WITH BOTH DART AND BELL/AAI SKIDTUBES.

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Revision: G Date: 11.08.30

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CLIENT	DAT	AELOSALE			DATE ACUREN JOB NO.	Nov 0/12	TIME AN	M Z PM D
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TEM(S) EXAMINED								
JOB DESCRIPTION	i	PROCEDURE No. LT	0002 REV.	/DATE		TECHNIQUE NO. LT		2008
PART NO.	SEE	RESW-78			MATERIAL AL	Curinum	THICKNESS	mous
SCOPE								
TEST DETAILS							T REMOVARIE	☐ Post Emulsified
METHOD			☐ VISIBLE		WATER WASH	H □ SOLVEN N /6459 □ OUTPUT		
FAMILY BRAND	MAGNAF	MINIMUM DWELL TIME	= 4<1K	Min.	LIGHTING EQUIP	FLASHLIGHT TROUB	SLELIGHT OUTPUT	T>100 fc @ SURFACE
PENETRANT PENETRANT REMOVER	2667 R 420	MINIMUM DWELL TIME MINIMUM DRY TIME	>10	MIN.	OTHER L	ABINO		
DEVELOPER	Sho 52	MINIMUM DWELL TIME	E 10	Min.	LIGHT METER S/N	N 1898866	CAL DUE [DATE NOU 12
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TEST SURFACE		IND.	Neiber		MACHINED	☐ SHOT BLASTED	Z CIF	EAN BARE M ETAL
SURFACE CONDITION SURFACE TEMPERATE	URE □ < - 4°C/	0.15	WELDED C/ 20°F TO 1	0°C/50°		10°C/50°F TO 52°		52°C/125°F
RESULTS-	URE (1 < -4°C/)							
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Scope of Services The agreement of Acuren Gr	roup Inc. to perform serv	vices extends only to those services	s provided for in w	vriting. Und	der no circumstances shall	ll such services extend beyond the pe nd assumptions supplied by the owne	erformance of the requested se er/operator and are not intend.	ervices. It is expressly unders led nor can they be construed
that all descriptions, comme	ents and expressions of o	opinion rejiect the opinions or obse	Cal Cal		he ourge/operator retains	complete responsibility for the engi	ineering, manufacture, repair a	and use decisions as a result.
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In performing the services p implied, is made or intended	orovided, Acuren Group d by Acuren Group Inc.	inc. uses the degree, care and skil	s orainarily exerci	u under s	circumstances by o	others performing such services in the		
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